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ENVIRONMENTAL ADVISORY BOARD
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Lieutenant General Thomas P. Bostick
Commanding General and Chief of Engineers
Headquarters, US Army Corps of Engineers
4111 G Street NW
Washington DC 20314-1000

Subject: Recommendations for improving the process of setting priorities for aquatic ecosystem restoration projects.

The attached report represents the Environmental Advisory Board's (EAB) second phase of recommendations on setting priorities for proposed aquatic ecosystem restoration projects. The first phase of our recommendations from 2013 included four criteria for consideration: use of an ecosystem approach; sustainable major ecosystem benefits; benefits derived primarily via hydrologic and geomorphic modifications, and; recognition of the federal role for any project selected for potential funding.

This second phase recommends changes to the current process of selecting projects to include in the Corps' recommendations to the President's budget. In summary, those changes include:

1. Separation of consideration of existing/continuing projects from consideration of newly proposed projects (which are the focus of our attached report);
2. preparation of a three-page fact sheet and two independent reviews of each proposed new study/project, one at the District level "preproposal" stage and one at the Headquarters level prior to inclusion of a proposed project in a budget request;
3. development of a computerized template applied to all proposed aquatic ecosystem restoration projects that prompts for specific information in order to generate facts covering the environmental context of the proposed location;
4. inclusion of ecosystem goods and services metrics for evaluating proposed projects;
5. changes to the importance weighting of the environmental metrics for developing an overall environmental score for a proposed project, and;
6. inclusion of a metric(s) that recognizes when proposed projects include integrated water resource planning across multiple budget lines.

These recommendations were developed after an in-depth assessment by the EAB of the Corps' funding criteria and prioritization process but evolved into assessment of the broader planning framework because the metrics for setting priorities propagated throughout that process, and we

found no reason to keep them separate. Our assessment was based on multiple interviews with appropriate Corps personnel, and review of pertinent documents, from October 2014 through February 2016 at Corps Headquarters, the Institute of Water Resources, the Hydraulic Engineering Center, and during normal EAB meetings held throughout the country. It is clear that your staff is replete with highly dedicated teams of people intent on improving the Corps' budgeting and planning process and are fully committed to the SMART Planning concept and the Campaign Plan. Their open and full cooperation helped us understand the existing paradigm, and we would like to thank each of them for allowing us to peak into nooks and crannies that probably made them a little uncomfortable; yet those actions should allow an improved selection process.

The EAB recognizes that these recommendations may seem intrusive and onerous on the surface. However, while we are not suggesting wholesale changes, much of what we discuss in our report is already being discussed amongst Corps' personnel, or is already under development (e.g., the computerized template). We trust that you will find these recommendations complement the intent of the Corps' other recent transformative planning actions, such the Environmental Operating Principles, SMART Planning and the 2015 Campaign Plan. We believe that if these recommendations are implemented, the Corps will achieve greater quality and efficiency in its proposed studies and projects under the Corps' congressionally mandated requirement to restore the nation's aquatic resources.

Dr. Sam Atkinson and Prof. Charles (Si) Simenstad were the leads on this project.

Please let me know if you would like to discuss the ideas presented in the attached report.

Sincerely,

Dr. Rollin Hotchkiss, Chair
Chief of Engineers Environmental Advisory Board

cc: Mr. Theodore Brown, Chief of Planning & Policy Division
Ms. Mindy Simmons, Senior Policy Advisor, Planning and Policy Division

EAB Task 1.1. Recommendations for Improving the Success of Setting Priorities for Aquatic Ecosystem Restoration Projects

Dr. Sam Atkinson and Prof. Charles (Si) Simenstad

19 August 2016

Context

The nation has affirmed many times, through actions, policies, laws and litigation, its commitment to protect and preserve its ecological resources, and to restore them if they have become degraded. As one of its missions to strengthen our Nation, the USACE is the federal entity that has been authorized by Congress to restore significant aquatic ecosystem functions, structures and dynamic processes that have been degraded.

In response, USACE personnel (or districts or divisions) propose approximately 150 aquatic ecosystem restoration (AER) studies and project each year (not including those in the Continuing Authorities Program, or CAP). The USACE Environmental Advisory Board (EAB) has been asked to review the project prioritization and selection process that is used by USACE to recommend projects to the President's budget and annual work plans, and make recommendations where appropriate.

This EAB effort was initiated by a response to a request in January 2012 by Major General Walsh for the EAB to recommend criteria to assist the Corps in deciding which ecosystem restoration projects to fund. In its April 2012 response to this request, outlined in a white paper on "Determining the Corps' Interest in Aquatic Ecosystem Restoration," the EAB recommended four criteria: (1) projects should address restoration using an ecosystem approach; (2) projects should demonstrate sustainable major ecosystem benefits; (3) projects should achieve ecosystem benefits primarily through modification of hydrologic and geomorphic processes; and, (4) the Corps should engage in aquatic ecosystem restoration where there is a recognized federal role in the problem requiring restoration action or there is national recognition of the ecosystem problems to be addressed. The Corps' April 2013 response to the EAB recognized that these criteria developed a reasonable rationale but did not provide specific project characteristics that might be considered in determining whether criteria are met and which could be applied to rank projects for funding. In continuing to address this issue under its 2013-2015 Work Plan (Phase 2 of Subtask 1.1), the EAB pursued a more in-depth assessment of the Corps planning framework and funding prioritization process. EAB members Atkinson and Simenstad assessed the process through interviews with appropriate Corps personnel and review of pertinent documents from October 2014 through February 2016 at Corps Headquarters (HQ), the Institute of Water Resources, the Hydraulic Engineering Center, and during EAB work sessions held throughout the country.

Our conclusions from these discussions and inquiries were that the existing Corps framework for planning ecosystem restoration from project conception to funding prioritization does not necessarily result in funding projects with the greatest potential of meeting the Corps' AER goals. Recognizing that funding prioritization is the integrated

product of the entire planning process, we identified a number of weaknesses that should be addressed: (1) lack of an objective, standardized process; (2) subjectivity of study/project assessment criteria/metrics; (3) ease of study/project proponents to manipulate (i.e. "game") the process; (4) lack of independent review input; (5) potential bias imposed by bundling "new start" studies and projects with on-going feasibility and construction projects; and, (6) the lack of recognizing and rewarding the value of watershed-scale, multi-business line, and interagency planning of ER projects that advance integrated water resource management. Much of our inquiries were concentrated on the inconsistent and somewhat opaque process for populating the AER-specific criteria within the Civil Works Integrated Funding Database (CWIFD) through the phases of the planning process, and the subjective assessment of benefits at the budgeting stage.

The EAB offers the following recommendations for adaptation of USACE process and specific criteria ("metrics") for identifying studies and projects that are of high significance in achieving the USACE mission to restore degraded aquatic ecosystems and prevent future environmental losses. We provide these recommendations because we believe they would significantly advance the USACE Campaign Plan (USACE 2015), specifically Goal 2 (Transform Civil Works) Actions 2a (Modernize the Civil Works Project Planning Program and Process) and 2b (Enhance the Civil Works Budget Development Process with a Systems Approach) and Goal 4 Action 4a3 (Maintain and Advance DoD and Army Critical Enabling Technologies), and Smart Planning (http://planning.usace.army.mil/toolbox/smart.cfm).

Basic Recommendations

1. Improve efficiency and objectivity of the study and project planning and prioritization process from conception to funding decision

To contribute to a more systematic and objective process (see flow chart, below), the Corps' planning and prioritization framework should consider instituting a simple pre-proposal step for new study starts prior to entry into CWIFD. Study concepts could be simply and objectively summarized in two components:

a. a one- to three-page summary of the study or project concept and ecosystem benefits anticipated, populated primarily by menu-driven responses to an interactive computer/web, pre-populated template of uniform questions generated at HQ level; and,
b. a one-page environmental fact sheet describing the project's local and regional environmental context (1.c below) extracted primarily from intersections of spatial data contained in multiple federal databases with the Geographic Information System (GIS) spatial definition of anticipated project footprint, at both local and watershed scales

The preproposal should entail limited time involvement via a systematic entry of the project summary, which would result in an efficient, unified "screening" document that would be accompanied by quantitative background information drawn from the GIS software. This would require development of interactive, pre-populated choices covering project planning and review that expands on and takes advantage of existing Corps software known as "the NEPA Cumulative Effects Assessment Tool". The environmental fact sheet would enable automated queries for spatially-explicit

information at any scale, but would be specifically intended to capture the watershed context of the proposed project (See #4, below). Given the emergence of such software tools in the Corps, there is the ability for CWIFD to draw from many Corps and other national databases (e.g., Environmental Restoration Business Line Database [ERBLD]; Regulatory In-Lieu Fee and Bank Information Tracking System [RIBITS]; ORM).

The Summary and Fact Sheet would provide a common, concise template for rapid, independent review of the potential project's environmental context at the initiation stage of the planning process (see #3, below), This template could be used as initial input to the CWIFD if the project concept were to be moved into the planning queue, and progressively refined and expanded as the study and project matured.

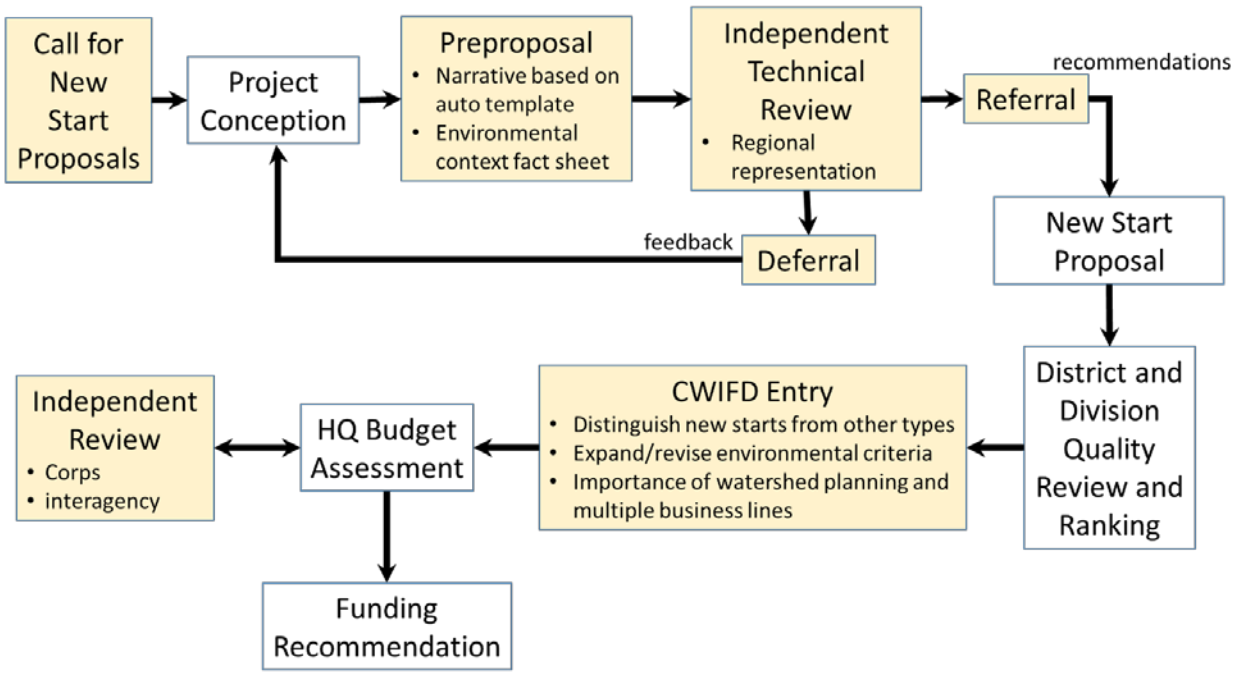

Figure 1. Overview of recommended process. Items in highlighted boxes are new to the existing process shown in white boxes.

2. **Adapt and expand sources of data included in the Civil Works Integrated Funding Database (CWIFD) to better assess the environmental characteristics of ecosystem restoration projects that are in the federal interest. The spreadsheet should be more transparent, and comparisons of proposed actions should be more straightforward. At a minimum, "new start" studies and projects should be assessed and ranked independent of existing feasibility studies and construction projects, with distinct scores and rankings distinct from on-going studies and projects.**

The existing AER budget ranking criteria should be expanded, refined, and the ranking system standardized in order to more effectively characterize the potential of AER projects to benefit the nation's environment. We acknowledge that the existing seven qualitative criteria—habitat scarcity, connectivity, special species status, hydrologic character, geomorphic condition, self-sustaining, plan recognition—are appropriate

indicators of potential AER project effects. However, the scoring of their contribution to AER project performance, and thus budget ranking of national significance, currently appears to be nebulous and somewhat capriciously applied through the planning process. Additionally, “national significance” is inexplicably attributed to only the habitat scarcity, connectivity and special species criteria, and scored unevenly. Furthermore, the possible scores assigned to each ecological criterion have been effectively converted from continuous scores (e.g. 0 to 25) to more categorical scores (e.g. the drop down selection offers 0, 5, 10, 18 or 25). As suggested by the recent McKay and Battles (2012) study of the hydrologic character criterion in the CWIFD spreadsheet, more detailed definitions and examples of appropriate scores would promote greater objectivity and technical rationale for an assigned score. We recommend that the Corps examine each of these criteria in a manner similar to McKay and Battles, and refine the definitions and scoring systems for each based on that analysis.

As promoted in a number of contemporary guidance documents, the EAB encourages the Corps to move more toward ecosystem processes-based criteria of environmental benefits, and away from single-species and habitat area metrics. Accordingly, with the objective of more accurately capturing the environmental benefits of AER projects, the EAB encourages the Corps to incorporate metrics of ecosystem goods and services into the ranking criteria. One or more metrics that address ecosystem goods and services should be developed and included in the spreadsheet. The EAB does not purport to prescribe a specific list of ecosystem goods and services, which may require considerable policy analysis to assess potential limitations of specific AER authorities. However, it would be most desirable to encompass an ensemble of criteria that more accurately capture the breadth of ecosystem restoration values to the nation. An ensemble such as presented by Reed *et al*. (2013) would encompass both criteria that fall under the Corps’ mission as well as those that intersect with other agencies. Reed et al.’s ensemble includes: Ecosystem Sustainability; Natural Hazard Mitigation; Recreation; Navigation Conveyance; Aesthetics; Water Supply and Regulation; Water Purification and Waste Treatment; Property, Infrastructure, and Raw Materials Protection; Food Provisioning; Cultural and Spiritual; Climate Regulation / Carbon Sequestration; and Human Health and Safety.

The Plan Recognition criterion should be modified to identify and assess proposed “new starts” studies in the context of other Corps projects in the same watershed to more accurately determine the cumulative benefit of a proposed project. Projects, across all business lines, that exist or are planned in the project watershed should also be identified, especially at the pre-proposal stage. As highlighted in Reed *et al*.’s (2013) IWR guidance, incorporation of ecosystem goods and services would provide a multi-faceted view of the effects, both beneficial and adverse, of ecosystem restoration projects. If the project increases ecosystem goods or services that intersect with other federal agency authorities or crossover into other USACE business lines (e.g., flood control, recreation), the cumulative magnitude and benefits of and impacts to those goods and services should be described.

No matter how the criteria are modified or expanded, a more standardized ranking process, either numerical or categorical need to be applied to any procedure that “rolls up” the ranks. If numerical, the seven existing ecological metrics should be rated using the same scale (e.g., 1 to 5, where 5 means the project results in the best possible

outcome for that metric and 1 means the project does not improve that metric, or does not address that metric). To avoid introducing additional subjectivity, the EAB discourages the application of weighting of the criteria at the District or Division level. If importance weights need to be introduced at the budgeting stage for myriad reasons, it may be appropriate to incorporate a mechanism to introduce importance weights to the ecological criteria at the Headquarters project prioritization stage. Under a process in which importance weights are introduced by Headquarters, each criterion should be weighted between 1 and 5 based on the importance of the criterion to the decision making process in light of the overall watershed characteristics where the project is proposed. Any weight above 1 must be fully justified; more justification is required for a weight of 3 than a weight of 2, and a weight of 5 requires ample, scientifically based and fully vetted justification.

3. Initiate independent review and advice into planning and funding priority process

Independent review of Corps' assumptions, conclusions, recommendations and decisions about water resource projects has been an issue of concern since at least WRDA 2000 (NRC 2002) and specifically in WRDA 2007 (33 U.S.C. § 2343). With some exemptions, review of project studies is mandated if they are large (>$45 million), the Governor of an affected State initiates a request, or if the project is controversial due to significant adverse effects.

The Corps has implemented reputable approaches (i.e., Independent Peer Review [IEPR] and Risk Registry reviews) for independent review of feasibility studies. However, review panels can only offer their opinions as to whether there are sufficient analyses upon which to base a recommendation for construction, authorization, or funding because the Chief of Engineers is ultimately responsible for the final decision on a planning or reoperations study. Because the review will necessarily include internal Corps' opinions, there may be some conflict of interest needing reconciliation. The EAB recognizes that independent review at the conception of new start studies and projects at the stage of final funding recommendations must remain fundamentally advisory, but by involving other agencies who have an interest in the project these agencies may become more invested in common support of the Corps recommendations and appreciate increased transparency in the prioritization process as well.

We recommend two levels of independent review:

1. Independent technical review of pre-proposals conducted by local agency representatives and stakeholders at the Corps' District/Division level:

   Preferably, these reviewers would be technically familiar with AER projects and objectives in the region but without conflict of interest in the pre-proposed projects. An alternative approach would be to assemble technical reviewers from within the Corps who are AER experts in other Districts or Divisions in the broader region.

   We recognize that conducting a review may initially appear to be an onerous task. However, given the brief pre-proposal documents and the existing models for comparable fast-tract reviews among academia, NGOs [and other resource agencies, we are convinced that the effort required is tractable. Independent

technical review at the pre-proposal stage would benefit parity and trust in the planning process. In addition, it is the EAB members' experience that the initial objectives, scope and scale of the pre-proposed project often benefits significantly from feedback provide by the review. Even for pre-proposed projects that do not, in the end, meet the review criteria from the Corps' perspective, may find support in other agencies or entities represented among the reviewers.

Additional review independence, benefiting from the building of inter-agency partnerships, could be achieved by including geographically-organized groups, such as the Landscape Conservation Cooperatives (LLC) that have a standing population of scientists and technical experts to draw upon.

2. Interagency review at HQ of final project list:

   Even though there is reputable review of projects through various steps of the Corps' current prioritization process, and through the vertical team structure, the ultimate integrity of Headquarters budget selection process is not served well by such an internally constrained and minimally transparent process. The EAB recommends that Corps HQ initiate a level of independent review of the final CWIFD-based prioritization of ER projects, where the reviewers are from partner federal and state agencies. We envision that this would be essential for new start studies and projects but could conceivably also be applied beneficially to the budget screening analysis of on-going projects. Vetting of the Corps' technical assessment of project benefits by federal agency partners with shared objectives would foster both trust in the Corps' commitment to its environmental mission as well as provide opportunities for partnering on project implementation and funding. This type of review process will likely result in increasingly better projects because they are considered through the lens of watershed-based planning.

4. Formally recognize and encourage projects that promote integrated water resource planning

Given the scientific consensus and the Corps' own planning documents (Shabman and Scodari 2014), the EAB perceives a low budget priority for projects or plans contributing to integrated water resources management (IRWM), and believes they deserve greater importance. It currently appears that projects that benefit multiple business lines are downgraded when compared to projects where benefits are contained within a single business line. Watershed planning studies and projects bridging multiple business lines or interagency partnerships should be at least assessed parallel to single-purpose projects if not elevated above them. To ensure recognition of their unique value, the Corps should consider establishing a discrete ranking category to identify a watershed study (EC 1105-2-411) or component project thereof that crosses budget lines.

One of the more important objectives of this recommendation is to ensure that dependency among projects is identified and that potential interdependence among projects is considered in the budget process for ER as well as other business lines. Identifying co-dependencies among projects, including sequence of completion, would promote synergic benefits, promote cost savings and minimize impacts.

Ecosystem restoration in basins that occupy multiple district and division boundaries is an explicit illustration of projects in the federal interest. Promoting a process for syncing Corps' ER planning with restoration actions by other agencies at the watershed scale (WRDA 1986, Section 729- Study of Water Resources Needs of River Basins and Regions) should engender collaboration and budget optimization.

Summary

Funding

We recognize that a number of these recommendations will involve additional up-front resources, both in personnel commitments and funding; however, they would likely promote greater efficiency and perhaps lower effort needed in the prioritization process moving forward. We do not intend them to be onerous for the existing Corps system, but to make decision-making more transparent and meet the Corps' mission. The review processes being recommended here should be funded out of Headquarters so that the changes won't be seen as unfunded mandates.

Precedence

The essence of these EAB recommendations is not new to the Corps – increasing transparency has been advocated within the Corps' own technical guidance. Acknowledgement of the inconsistencies and lack of transparency in the planning and funding prioritization processes, as well as approaches to address them, is evident in prior guidance documents, both internal and external to the Corps. These guidance documents provided substantive stimuli for the EAB recommendations. For example, in a March 2007 memorandum on *Policy Guidance on Authorization and Budget Evaluation Criteria for Aquatic Ecosystem Restoration Projects*, Major General Riley argued for the recognition of multiple project benefits and support of a watershed-based planning approach involving other Federal, non-Federal and stakeholder interests. Recommendations for the need of independent, external reviews by Corps' projects have been voiced for over a decade (e.g., NRC 2002), codified in WRDA 2007 (Sec. 2034[i][2]) and implemented in 2013. Attempts to improve and provide more objective and quantitative assessments of the technical significance of ER was initiated in a 2011 workshop (Tazik 2012) and an insightful analyses of ER benefits emerged more recently (McKay *et al.* 2012; Convertino *et al.* 2013; McKay and Battles 2016). The applicability of ecosystem goods and services to the Corps' planning process has emerged with increasing frequency since at least 2003 (Stakhiv *et al.* 2003; Reed *et al.* 2013) and is the focus of a separate EAB white paper presented to the Chief in early 2016. The Corps and its ER partners are certainly poised with the initiative, technical capacity and tools to incorporate these concepts into a modern, comprehensive planning and budgeting process that fully captures objective and cost-effective environmental benefits.

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